

Exercising Space War, Space and Counterspace: A Chapter in Future War

This article explores how the military Space community impacts the nation's warfighting ability in questioning the assumption of Space superiority in future conflicts. As Space professionals, it is our duty to honestly assess the critical role we have in the overall national security construct. The spectrum of challenges we face (economics, technology, personnel, systems, etc.) can neither be addressed in a single article nor at this classification level. Therefore, only the area of threats to our Space capabilities when we exercise will be covered.

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"Without Space situational awareness, the rest won't happen." United States Navy RADM Thomas E. Zelibor, United States Strategic Command (USSTRATCOM) Director of Global Operations¹

"U.S. Air Force counterspace operations are the ways and means by which the Air Force achieves and maintains Space superiority. Space superiority is a distinctive capability of the Air Force." Air Force Doctrine Document (AFDD) 2-2.1 Foundational Doctrine Statements

Defensive-Offensive Counterspace

The Space capabilities currently fielded by the U.S. comprise the leading technology shaping future 21st century military forces. U.S. communications, detection, intelligence, surveillance, reconnaissance, weather, warning and precision navigation capabilities have enhanced combat capabilities to the point that everything from force structure to the number of desired mean points of impact can be struck on each mission. For example: many aircraft using many bombs on one to few targets as opposed to one aircraft using one bomb per target to achieve a kill, must be recalculated and reevaluated as we further integrate them throughout the joint warfighting spectrum. The synergistic effect of combining the aforementioned capabilities provided by Space systems with air and surface weapons platforms has yielded results much greater than the sum of the individual parts. Additionally, effects based operations can be implemented on a much wider scale and with greater efficiency and effectiveness than previously attainable without current Space capabilities. This Space power comes with a military as well as an economic price:

it must be heavily protected. Civilian and military leadership accepts the staggering economic cost of Space power and appreciates the increased combat capability Space systems provide. Policy makers must now address the vulnerabilities of these systems, as we grow more dependent upon this technology. The great strength we draw from our Space assets is also a great weakness because we rely so heavily on those capabilities. It is critical now and in the future to gain and maintain our Space superiority if we are to prevail in future conflicts against adversaries who have access to Space technology, understand our dependency on Space and plan to negate our advantage. This, unfortunately, has not been an area where we train the way we will fight.²

The U.S. military does an excellent job of exercising at the tactical level and a satisfactory one at the strategic level. It's at the operational level of war where progress in joint warfighting capabilities can best be measured. While this area has not been neglected by all of the services, the activities at this level have not been sufficiently considered since they will most likely determine the successful conduct of war now and in the future. This judgment is supported by exercises involving the Combined Air Operations Center (CAOC) where the combined forces commander and the combined forces air component commander can see the entire theater of war (observe, orient, decide and act) and based on this information shape the battlespace.

There are fundamental differences between war training and wargaming. In general, war training is when the expected war processes, tactics and procedures require training everyone involved (from the leadership on down) in a sterile, nonviolent environment so the focus is upon learning. Wargaming is when there are two distinct sides: the blue/good

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Adversaries can conduct attacks against our Space capabilities using various methods both symmetric and asymmetric

Adversaries may have the capacity to develop counterspace capabilities but, in many cases, may simply acquire them from a third party. Near and far-term threats may include the following:

- Ground system attack and sabotage using conventional and unconventional means against terrestrial nodes and supporting infrastructure.
- Radio frequency jamming equipment capable of interfering with Space system links.
- Laser systems capable of temporarily or permanently degrading or destroying satellite subsystems, thus interfering with satellite mission performance.
- Electromagnetic pulse weapons capable of degrading or destroying satellite and/or ground system electronics.
- Kinetic antisatellite weapons capable of destroying spacecraft or degrading their ability to perform their missions.
- Information operations capabilities capable of corrupting Space-based and terrestrial-based computer systems utilized to control satellite functions and to collect, process and disseminate mission data.

Adversaries do not need to be Space-faring nations to exploit the benefits of Space

Adversaries can purchase Space products and services, such as imagery and communications, which often rival those available to U.S. military forces. Adversaries may leverage U.S. or friendly systems to their advantage as well. For example, an adversary may use the NAVSTAR GPS constellation for navigation. In conflict, adversary access to Space decreases U.S. advantage and increases the threat to friendly military forces. AFDD 2-2.1 Pg 4

Multiple countries have invested in counterspace technologies and have studied how the U.S. military operates. They have a high level of confidence in their knowledge of how dependent we are upon our Space capabilities. Unfortunately, we cannot identify specific countries and known/potential capabilities here due to classification. **Please visit the sites listed at the end of this article.**

guys and red/opposing forces. Each is given a set of rules and objectives to follow. There is normally room for some experimentation, but the results are always the same: Blue wins because blue has to win. We cannot afford to continue only using these two divergent ways of figuring out how we will fight. To fully integrate the diversity of Space and information operations into the fight, we must add a new third way: the joint force (purple) will meet not only the apparent red but also gray (commercial),³ orange (terror/ guerilla groups and hostile countries), white with red stripe (neutral country hiding/hosting hostile groups), light blue (ally nation, not quite with the United States) among other categories. By adding more actors we can produce the shift in mindset that will push us closer to the reality we already face and the environment we will operate in future wars.

Top Air Force leaders have stated: “You can’t go to war and win without Space,”⁴ and just as importantly, “If the opponent has any brains at all ... disrupt it to deny them (U.S.) the use of Space ...”⁵ In light of these statements, why are there still problems in getting the “message” through to non-Space audiences of the importance of what Space brings to the fight? Each service has unique hurdles to cross when it comes to education, just as each branch continues

to evolve its respective Space mission areas. The U.S. Air Force has the preponderance of forces and therefore is expected to lead. Yet the overall mindset has not evolved past third dimensional air-centric thought. Space-centric thought is not needed to replace or merely to augment that thought; we need to propagate a “total” rethinking that most effectively combines all ground, air, naval, Space and information operation combat power for future wars. Therefore, it is incumbent upon Space professionals in all services, with the Air Force leading the way, to maintain our Space superiority through vigilant counterspace operations. The U.S. military can neither afford to lose future conflicts nor the opportunity to capitalize on our current fortune.

The U.S. is the nation most heavily reliant on technology for its economy, defense and way of life.⁶

In addition to exploiting Space for their own purposes, future adversaries will also likely seek to deny U.S. forces unimpeded access to Space.⁷

Threats to Space Systems

The Space community has not fully appreciated emerging foreign offensive counterspace capabilities (in terms of
(See *Future War*, page 60)

Space situation awareness (SSA) is crucial for assessment of counterspace operations

Space situation awareness (SSA) is crucial for assessment of counterspace operations. SSA is an important source of battle damage assessment (BDA), particularly for counterspace operations against Space nodes and links. Certain counterspace operations, particularly those with non-kinetic effects, may require focused, real-time BDA to effectively assess an adversary's defensive counterspace response. AFDD 2-2.1 pg. 53

methods, systems and knowledge) and the willingness to use them against U.S. assets. The list of Space-faring nations continues to grow on account of low-cost access to Space enhancement capabilities versus the "old" standard of indigenous launch capability only.

The heavy reliance on the commercial civilian sector for the bulk (80 plus percent in some cases) of satellite communications (SATCOM)⁸ is a fact not lost on our adversaries. Many of those same satellites are either owned (wholly or partially) or used by those with whom we may come into conflict someday. Since these countries have the exact same access and/or capabilities that we have, does it not stand to reason that they also fully understand the advantages and vulnerabilities in this single slice of Space power? (see example: unclassified DISA briefing on DoD use of Wideband Commercial SATCOM, Mar. 4 2004, slide 6 titled Commercial SATCOM Support to the GWOT.)⁹

The gray Space order of battle, regarding U.S. commercial and neutral foreign (commercial and government) Space systems, can be difficult to develop and maintain. Status on U.S. commercial providers requires their voluntary participation, as U.S. law and pol-

icy strictly limit the ability of U.S. intelligence agencies to collect, retain or disseminate information concerning U.S. persons and corporations. The importance of third party providers must not be understated as they provide Space capabilities to numerous clients, including friendly and adversary military operations. AFDD 2-2.1 pg. 24

By assuming away potential adversarial capabilities, we risk placing our future superiority, even our very survival, in grave peril. Space systems affect much more than the immediate joint Space community. Space capabilities are interwoven throughout the enhanced combat operations spectrum to enable the near-real-time intelligence gathering and dissemination, instantaneous worldwide communications, precise navigation and level of situational awareness we are now accustomed to in the U.S. military. These combined capabilities, plus the capability called "reachback," are made possible by Space assets and can be removed from the list of superiority assets by a determined enemy.

*"Everything that can be invented
has been invented."*

— Charles H. Duell,
Commissioner,
U.S. Patent Office, 1899

Closed Minds, Spacious Skies: Current Attitude vs. Current Vulnerabilities

Currently, "unrealistic" scenarios drive exercises. Resources are rejuvenated through models and simulations, so overall exercise results may be inflated. However, even though exercise scenarios may seem unrealistic or appear as such, it stands to reason: 'war' in Space has not happened to date, and until an actual "war" in Space happens, we can only make probable guesses at what a Space war would look like. Will we recognize it when it does occur or will someone assume or dismiss it simply because it does not "fit the model?" Just because an event or tactic did not originate from our think tanks or we never wargamed it that particular way does not eliminate it from the realm of the possible.

Exercises are conducted to achieve specific training objectives and to expose the training audience to myriad problems that may be encountered and continue the mission. For training to best prepare participants, exercises should be planned and conducted as close to real operations as possible. The expected results should not be the "flawless" performance of systems and crews or the successful showcasing of the latest innovation. Rather, the "reality" test is based on how well Space systems can overcome a sustained attack on vulnerabilities and whether crews can recognize, understand and solve the problems an enemy forces on them. In some cases, it must be understood that certain aspects cannot be duplicated or somehow made "realistic" due to either real world requirements or uniqueness of systems. Those simulations can only be presented as "you no longer have capabilities X

DODD 3100.10, Department of Defense Space Policy, states:

- “Space is a medium like the land, sea and air within which military activities shall be conducted to achieve U.S. national security objectives.
- Ensuring the freedom of Space and protecting U.S. national security interests in the medium are priorities for Space and Space-related activities.
- Purposeful interference with U.S. Space systems will be viewed as an infringement on our sovereign rights. The U.S. may take all appropriate self-defense measures, including, if directed by the [President and/or Secretary of Defense], the use of force, to respond to such an infringement on U.S. rights.
- Space activities shall contribute to the achievement of U.S. national security objectives by countering, if necessary, Space systems and services used for hostile purposes.”

and Y, what do you do?” Space forces must be exercised to the fullest extent possible consistent with operational requirements. To improve readiness, Space forces should participate as a full partner with joint service and information assets in large-scale exercises overseas and in the continental U.S. Perhaps the best way to demonstrate exactly how integrated and crucial Space systems are in joint warfighting is to allow all those advantages to be “removed” by plausible enemy action. Joint exercises can provide realistic training for in-theater and deployable Space forces of all services, plus give emphasis to the added problems inherent in working with allied military forces. Valuable experience in integrating Space systems will only occur if these opportunities are not squandered or beset by parochial bias. Instead, systems, processes and procedures should be tested to the breaking point with success measured by how fast systems are recovered (restoration of expected capability or in the case of redundant systems, the speed of retasking) or how many causes (the “how” and “why”) of failures are established when faced with a determined knowledgeable Space adversary.

Opportunity to Excel

We can overcome the limitations and barriers of how we conduct current exercises. We have the tools and means available to us: professional journals, the Space operations school, the implementation of Space profes-

sional development, Army (FA 40) and Navy Space career fields, Space aggressor squadrons, the integration of Space and information operations into joint/combined exercises through the 505th Command and Control Wing to name a few. The final hurdle is mindset. If flexibility is the key to airpower, then elasticity of the mind must open the door to Space power. When we look back upon our short Space-faring history, we need to continue the leap of faith that the pioneers held. Looking into the future, we need not wait until capabilities are fielded to imagine what existing present day threats can do and will do if we fail to identify and correct our vulnerabilities. The German *Wermacht* formulated a coherent combined arms doctrine and held experiments to test this doctrine in the 1920s without possessing a single armored fighting vehicle in their inventory.¹⁰ These actions laid the groundwork for future *panzer* forces and *blitzkrieg* tactics that shocked the world and conquered Europe in record time. We cannot continue to wait for our adversaries to drive the train and field capabilities before considering crisis action planning. We will not prevail by reaction to events, after being surprised by adversary actions, then having to explain to the American people that we did not foresee such things, but rather by embracing the reality of living, thinking enemies who will use their full set of capabilities to win in future conflicts against us. We need to ensure greater freedom in exercises by

wargaming against a worthy opponent, against more than one Space-faring nation, or even going a step further and fighting against a slightly “superior” Space enemy that will challenge us across the full spectrum of capabilities. Who learns more in a conflict: the winner or the loser? What about those countries that have sat back and taken notes of how we have conducted war since 1991? If we continue to script exercises so that we always win or never really push the envelope to deal with a concerted effort to wipe away our Space superiority, are we truly benefiting ourselves or are we inviting a recipe for disaster?

“With the advent of Space-based satellite systems, we can no longer base sea power on shipboard capabilities alone. Today, and increasingly tomorrow, a sea-faring nation must also be a Space-faring nation.”¹¹

The ability to use current Space technology for knowledge of weather, intelligence on enemy disposition, instant updates and communications allows the services to employ true economy of force. U.S. military power, through the proper usage of Space assets, has experienced combat enhancement and force multiplication. This power has the awesome potential to bring forces and weaponry to mass at the right point, by enabling multi-spectral vision and superior intelligence preparation of the battlespace. Tech-

U.S. Strategic Command mission:

Establish and provide full-spectrum global strike, coordinated Space and information operations capabilities to meet both deterrent and decisive national security objectives. Provide operational Space support, integrated missile defense, global command, control, communications, computers, intelligence, surveillance and reconnaissance, and specialized planning expertise to the joint warfighter.

nology is compensating for reduced numbers of platforms and troops (the age-old “quality vs. quantity” comparison). History is replete with examples of those who won with either quantity (such as World War II U.S. Sherman tanks vs. German *Panzers*¹²) or quality (such as ancient Roman expertise in engineering¹³). We do not want to be on the wrong side of history when struggle for national survival occurs. Rather, the capabilities that are in development (see box on page 63, “U.S. Air Force Plans for Future War in Space”) should firmly remain in the U.S. column and vulnerabilities of U.S. systems mitigated by thorough testing and aggressive experimentation to find the weak points (doctrine, employment, processes, equipment) before our enemies do.

“The battle, sir, is not to the strong alone; it is to the vigilant, the active, the brave ...”

— Patrick Henry

No Time to Waste

Unfortunately, it may already be too late to push advancements in technology further through the pipeline and be fielded before we engage in a Space war. We have to rely upon the tactics, constellations, configurations and protections that currently exist and trust

the assessments on how far behind our adversaries are in exploitative techniques.

The slim technological superiority edge we currently enjoy is being eroded not only through our own inaction but also by the leaps and gains of all actors in the counterspace arena. Current Space capabilities have laid the groundwork for effects-based operations to be implemented on a wider scale with greater efficiency and economy of force. Doctrine, strategy, tactics and exercises, while acknowledging threats, are only the baseline environment for adaptation of thought. They are not the final product or goal in the evolution of ideas. There has to be complete cooperation from all sectors of the Space community to calculate the totality of U.S. military might, all Department of Defense, certain civilian government agencies and commercial entities must be in the equation.

However, there is hope for the immediate future if we recognize and address this problem now. What we must do is go beyond the “jointness” revolution and push the knowledge of Space capabilities below the highest leadership levels (as evidenced by the various quotes, leaders in many positions understand the advantage of

Space superiority) in the strategic realm to the operational and tactical leaders and operators. These are the personnel who work in the combat theater. Current exercises, including those involving the Combined Air Operation Center, do not fully explore the extent of dealing with a Space equal or superior foe. The consequences for not exposing potential leaders and operators in a controlled environment to the possible effects of severe losses of capability could lead to the very least reduced economy of force to the almost unimaginable tragedy of unrecoverable catastrophe for the deployed joint force. This is not alarmist, merely acceptance that the stakes are high and there is no prize for second place.

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